Impact Of Adopting Microservices Architecture & Containerization Technologies

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Sri Lanka Institute of Information Technology or to any other institution for assessment for any other purpose.

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ABSTRACT

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The adoption of microservices architecture and containerization technologies has transformed the software development landscape, enabling organizations to achieve greater agility, scalability, and resilience in their systems. This thesis examines the motivations behind the adoption of these technologies, the challenges faced during implementation, and the strategies employed to overcome them. By analyzing case studies, industry reports, and survey data from professionals across diverse domains, the study identifies the key drivers such as flexibility, rapid deployment, and cost-efficiency.

The research also highlights critical obstacles, including the complexities of managing distributed systems, the cultural shift to DevOps, and the need for enhanced technical expertise. Furthermore, this work proposes actionable frameworks and best practices to facilitate successful adoption, including the integration of automation tools, effective training programs, and robust security measures.

The findings of this research contribute to a deeper understanding of the transformative potential of microservices and containerization, offering valuable insights to organizations aiming to harness these technologies for sustainable growth and innovation.

Index Terms: Microservices, Containerization, Kubernetes, Agile Development, Scalability, Automation.

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